

## ARGUMENT IN SUPPORT OF PRE-APPEAL BRIEF REQUEST FOR REVIEW

Claims 1, 4-41, and 43-47 stand rejected under 35 U.S.C. §101 as directed to non-statutory subject matter. This is the only pending issue remaining in this case, as the Examiner has indicated that prior rejections under §112 and §103 have been withdrawn. The Examiner has also indicated that the aforementioned claims appear to define allowable subject matter under §§102, 103, and 112, but that he reserves a statement of reasons for allowance “until the issues under 35 U.S.C. §101 have been resolved.” Resolution of this issue is now sought by this request rather than by appeal.

The basis of the Examiner’s rejection of all the claims, has at its essence, his belief that none of the pending claims produce a useful, concrete, and tangible result. Oddly enough the Examiner fully agrees with the Applicant that finite element simulation has, in a broad sense, a practical application, but insists that this is insufficient to define a statutory process or apparatus. *See* Office Action dated 03/07/2006 pages 3-6.

In particular, regarding claims 1 and 47 the Examiner indicates that “a finite element simulation is a mathematical method or algorithm and is therefore not statutory subject matter.” *See Id.* at 3. Regarding claims 14 and 25, the Examiner indicates that the invention is tangibly embodied but does not produce a useful, concrete, and tangible result because, among other things, the claim “does not recite that the computer programs are actually executed...” *See Id.* at 4-5. Regarding claim 36, the Examiner indicates “a data signal embodied in a carrier wave” is not a proper tangible embodiment because “the claim is strictly limited to describing the physical characteristics of a carrier wave. The claim recites no transmitters, no receivers, no method for employing the carrier wave to achieve a result, etc.” *Id.* at 5-6.

The Examiner has encouraged the Applicant to find factual support in their arguments in MPEP 2106 and has informed the Applicant that “unsupported arguments and hyperbole of the type submitted in the previous response will be unlikely to overcome the bases of these rejections.” *See Id.* at 6.

Section 2106(II) of the MPEP, as cited by the Examiner, begins by stating the basic test for eligible subject matter (bold emphasis added):

[t]he claimed invention as a whole must accomplish a **practical application**. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "**real world**" value, as **opposed to subject matter that represents nothing more than an idea or concept**, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

Furthermore, section 2106 (IV) of the MPEP, which directly addresses how to determine "whether the claimed invention complies with 35 USC §101" has as its first point: "A. Consider the Breadth of 35 USC 101 Under Controlling Law," a portion of which is reproduced below.

As the Supreme Court has held, Congress chose the expansive language of 35 U.S.C. 101 so as to include "anything under the sun that is made by man." Diamond v. Chakrabarty, 447 U.S. 303, 308-09, 206 USPQ 193, 197 (1980). Accordingly, section 101 of title 35, United States Code, provides:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

In Chakrabarty, 447 U.S. at 308-309, 206 USPQ at 197, the court stated:

In choosing such expansive terms as "manufacture" and "composition of matter," modified by the comprehensive "any," Congress plainly contemplated that the patent laws would be given wide scope. The relevant legislative history also supports a broad construction. The Patent Act of 1793, authored by Thomas Jefferson, defined statutory subject matter as "any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement [thereof]." Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318. The Act embodied Jefferson's philosophy that "ingenuity should receive a liberal encouragement." V Writings of Thomas Jefferson, at 75-76. See Graham v. John Deere Co., 383 U.S. 1, 7-10 (148 USPQ 459, 462-464) (1966).

.... Thus, it is improper to read into section 101 limitations as to the subject matter that may be patented where the legislative history does not indicate that Congress clearly intended such limitations. Alappat, 33 F.3d at 1542, 31 USPQ2d at 1556.

The pending claims all relate to and claim different aspects of an improved finite element analysis or simulation. Independent claim 1 recites "A method for performing a finite element

simulation...;" independent claim 14 recites "A computer readable storage medium storing one or more computer programs for performing a finite element simulation...;" independent claim 25 recites "A computer system comprising... computer programs for performing a finite element simulation...;" independent claim 36 recites "A data signal embodied in a carrier wave, the data signal including one or more computer programs for performing a finite element simulation, the computer programs comprising;" and independent claim 47 recites "A method for performing a finite element simulation..."

It is therefore not understood why the previous arguments provided to illustrate the *real world value* and *practical application* of finite element analysis were dismissed as hyperbole. Generally speaking, the utility of finite element analysis and simulation is that it reduces design time and allows engineers to design better products. It is a very practical "tool" for an engineer to have in the design process. This is why it is widely used in industry. It is not by any means simply a natural phenomena or abstract math as the Examiner asserts. Furthermore, as this is admittedly esoteric subject matter, Applicants have provided real word applications of the present invention within the application itself. Beginning on page 19 in a section entitled *Exemplary Applications*, usage of the claimed invention is described regarding design of two different "real world" reference parts.

FIGS. 4A and 4B show a timeline of a switching procedure that was automatically generated using a method of the present invention to solve a simulation of the formation of a Budd Complex Channel, which is a well known benchmark part. FIG. 4C shows the Budd Complex Channel that results from the simulation timeline shown in FIGS. 4A and 4B.

The text in the *Exemplary Applications* section regarding the Budd Complex Channel touches on the specific utility or *real world value* of the claimed present invention and a portion of that is reproduced below:

For example, the automatic switching method produces a solution much faster than that which could be obtained using the manual switching procedure. Using the automatic switching method, the Budd Complex Channel simulation was completed in approximately 31 CPU hours on an IBM RS-6000/260 workstation computer. Using the manual switching procedure, a similar simulation was completed in approximately 27 CPU hours on the same computer. However, the trial-and-error process of determining the switching scheme for the manual method involved more than ten failed simulations. Thus the total simulation time using the manual switching method, including the trial-and-error

process, was approximately ten times larger than the total simulation time using the automatic switching method. The cost savings measured in terms of man-hours required to conduct the simulation was even more significant, since the trial-and-error process required by the manual switching method was extremely labor intensive, and required an experienced operator, while the switching procedure generated by the automatic switching method ran successfully on the first attempt without intervention by the operator.

Additionally, the automatic switching method produces a solution that is far more complex than that which could realistically be obtained using trial-and-error with the manual switching procedure. For example, the simulation of the Budd Complex channel using the automatic switching method involved fourteen switches between the implicit method and explicit method, while the manual switching scheme developed in over ten trial-and-error simulations included only three switches. FIG. 4D shows the switching scheme developed in the manual method, as compared to FIG. 4B for the automatic method. A complex solution using fourteen switches would have been virtually impossible to discover by trial-and-error using the manual switching procedure.

Page 21, line 17 to page 22 line 15.

Another example is also described and shown in FIG. 5A and 5B of the application. FIG. 5A shows a switching procedure that was automatically generated using a method of the present invention to solve a sheet metal springback simulation of the NUMISHEET '93 U-Channel part. FIG. 5B shows the NUMISHEET '93 U-Channel part immediately after stamping (shaded portion) and after springback has occurred (unshaded portion). For purposes of brevity, the text of that discussion will not be reproduced here but the panel is kindly referred to pages 22-24 for a description of the practical application and real world value of the present invention in the context of another example.

Thus, for all the reasons above, contrary to the Examiner's assertion, independent claims 1, 14, and 47 recite more than simply a mathematical method or algorithm. Regarding claim 14, one of skill in the art understands that computer software is made to be executed, and execution need not be recited in the claim in order for the claim to have utility, contrary to the Examiner's assertion. Likewise, independent claim 36 also recites more than simply a "natural phenomena," contrary to the Examiner's assertion.

It is also noted that finite element analysis and simulation is already the subject matter of many issued patents.

In summation, it is once again asserted that this is precisely the sort of subject matter that the statute, and indeed the constitution itself, seek to advance and protect with the patent system, as summarized by MPEP section 2106. Therefore, it is kindly asserted that all of the pending claims satisfy the letter and purpose of 35 USC §101 and are in condition for allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'P. Mikhail', with a stylized flourish at the end.

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